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Filed : September 23, 2003

REMARKS

In response to the Office Action mailed March 24, 2006, Applicant has amended the application as above. No new matter is added by the amendments as discussed below. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the amendments and the remarks set forth below.

Discussion of Claim Amendments

Claims 4, 7, 14, 16, 18, 20-21 and 24 have been amended. Upon the entry of the amendments, Claims 1-25 are pending in this application. The amendments to the claims are merely to correct typographical errors and do not narrow the scope of protection. Furthermore, the amendments to the claims do not introduce any new matter. Entry of the amendments is respectfully requested.

Discussion of Priority Document

The Examiner has noted that a certified copy of the application filed in Singapore has not been filed. Applicant would like to remind the Examiner that this application is a continuation application of international application No. PCT/SG01/00044, designating the United States, which has the effect of a national application from its international filing date. *See 35 U.S.C. § 363.* The PCT application did not refer to a priority national application. Thus, Applicant respectfully submits that it is not required to submit a certified copy of the international application.

Discussion of the Declaration

The Examiner has further noted that the declaration is defective, asserting that the declaration fails to identify the application by application number and filing date. Applicant would like to remind the Examiner that the declaration, listing inventors, attorney docket number and title of the invention, was concurrently filed this application. Thus, Applicant respectfully submits that the declaration is properly identified by the above listed information. *See MPEP 602 VI.*

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Discussion of the Drawings

The Examiner has raised an objection to the clarity of the drawings and in particular, the ineligible nature of the hand-written reference numerals. In reply, Applicant submits a set of new drawings with clearer reference numerals.

The Examiner has also objected to the drawings on the basis that reference numeral 52 (referring to the "score melody processing" block) in Fig. 3 is not referred to in the text of the specification. Applicant notes that the term "score melody processing" in the text of the specification was incorrectly labelled with reference numeral "82" instead of "52." Applicant has therefore amended the specification accordingly.

Applicant also submits that reference numeral "68" has been appropriately included in the text of the specification at page 10, paragraph 3. Withdrawal of the objection is respectfully requested.

Discussion of Rejection of Claims under 35 U.S.C. § 102(b)

Claims 1, 8, 13 and 23 were rejected under 35 U.S.C. § 102(b) as being anticipated by Blum, et al (U.S. Patent No. 5,918,223). Claim 17 was rejected under 35 U.S.C. § 102(b) as being anticipated by Ghias, et al (Query By Humming). Applicant respectfully submits that pending Claims 1, 8, 13, 17 and 23 are allowable over the cited prior art as discussed below.

Rationale of 35 U.S.C. § 102

"For a prior art reference to anticipate a claim under 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference." *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 677, 7 USPQ 2d 1315, 1317 (Fed. Cir. 1988).

Discussion of Patentability of Pending Claims 1, 8, 13 and 23

Each of independent Claims 1 and 23 recites, among other things, "(a) determining a first representation including a set of peaks and valleys corresponding to maximum and minimum values respectively of at least one characteristic of the audio/music" and "(b) determining a second representation including values representing relative differences between

the determined peaks and valleys.” Blum does not disclose the above-indicated features as discussed below.

1. Blum Does Not Disclose “(a) determining ... including a set of peaks and valleys ...”

Applicant respectfully submits that Blum does not disclose “(a) determining a first representation including a set of peaks and *valleys* corresponding to maximum and minimum values respectively of at least one characteristic of the audio/music.” The Examiner has cited the text at col. 6, lines 24-28, and, at col. 9, lines 1-41 as anticipating the above feature recited in Claims 1 and 23. However, neither passage in Blum expressly or implicitly teaches that both peaks **and valleys** are represented. The Blum citation merely teaches that the magnitude spectrum is analyzed to find peaks. Thus, Applicant respectfully submits that Blum does not disclose the above indicated feature of the claimed invention.

2. Blum Does Not Disclose “(b) determining a second representation including values representing relative differences between the determined peaks and valleys”

Applicant respectfully submits that Blum does not disclose “(b) determining a second representation including values representing *relative differences between the determined peaks and valleys*.” The Examiner has cited text at col. 8 of Blum which merely states that “PITCH-TRAJECTORY CLEANUP routine will look over the entire pitch trajectory and smooth the data while removing bad data points.” However, this neither expressly or implicitly discloses that the second representation includes values representing relative differences between the determined peaks and valleys. Applicant respectfully submits that the reference to the PITCH-TRAJECTORY CLEANUP routine looking over the entire pitch trajectory does not show the above-indicated feature of the claimed invention. Moreover, the functionality of the PITCH-TRAJECTORY CLEANUP routine is clarified further at col. 13, lines 49-52 as follows:

“(Phase 1) a removal of ‘jumps’ in the pitch trace, (Phase 2) a median filtering of the pitch trace and, (Phase 3) a removal of low-confidence pitch values.”

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Thus, it is clear that the prior art document is entirely silent in regard to the PITCH-TRAJECTORY CLEANUP routine determining a second representation includes values representing relative differences between the determined peaks and valley. Instead, it teaches that the PITCH-TRAJECTORY CLEANUP routine is used to merely remove and/or filter out imperfections in the pitch trajectory. Thus, Applicant respectfully submits that Blum does not disclose the above indicated feature of the claimed invention.

2. Summary

In view of the above, Applicant respectfully submits that Blum does not disclose the above indicated features associated with (a) and (b) of the claimed invention. Therefore, Blum does not anticipate independent Claims 1 and 23, and thus Claims 1 and 13 are allowable over the Blum reference. Claims 8 and 13 depend from base Claim 1, and further define additional technical features of the present invention. In view of the patentability of their base claim, and in further view of their additional technical features, Applicant respectfully submits that the dependent claims are patentable over the prior art of record.

Discussion of Patentability of Pending Claim 17

Independent Claim 17 recites, among other things, “(c) comparing the histogram of the first representation of the query with the histogram of the first representation of each database keyword.” Applicant respectfully submits that Ghias does not disclose the above feature of the claimed invention. The Examiner has cited the text disclosed at page 4, paragraphs 5-11 of the Ghias reference. However, the cited portion fails to disclose the use of histograms. Thus, Applicant respectfully submits that Ghias does not disclose the above feature. In view of the above, Applicant respectfully submits that Ghias does not anticipate independent Claim 17, and thus Claim 17 is allowable over the Ghias reference.

Discussion of Claim Rejections Under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 2, 3, 5, 10 and 11 under 35 U.S.C. § 103 (a) as being unpatentable over Blum in view of Yourlo (U.S. Patent No. 6,201,176). The Examiner has also

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rejected Claims 4, 6, 7, 9, 14, 16, 19 and 25 under 35 U.S.C. § 103 (a) as being unpatentable over Blum in view of one of Miller (U.S. Patent No. 4,813,076), Varne (U.S. Patent No. 6,831,220), Wang (U.S. Patent No. 6,990,453) and McNab ("Tune Retrieval in the Multimedia Library). The Examiner has further rejected Claim 7 under 35 U.S.C. § 103 (a) as being unpatentable over Blum in view of Varne, and in further view of Takenaka (U.S. Patent No. 6,807,450). The Examiner has also rejected Claim 12 under 35 U.S.C. § 103 (a) as being unpatentable over Blum in view of Yourlo, and in further view of Foote (U.S. Patent No. 6,542,869). Applicant respectfully submits that all pending Claims are allowable over the prior art of record as discussed below.

Standard of *Prima facie* Obviousness

In order to provide a *prima facie* showing of obviousness under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art. *See, e.g., In re Royka*, 490 F. 2d 981, 180 U.S.P.Q. 580 (CCPA 1974); MPEP 2143.03.

Patentability of Pending Claims

At paragraph 18 of the Office Action, the Examiner states that Claims 2 and 5 are rendered obvious in view of *Blum* when taken with the text disclosed at col. 9, lines 46-58 of *Yourlo*. In order for Claims 2 and 5 to be rendered obvious, the citations must teach each and every feature of Claims 2 and 5.

With respect to Claim 2, it is noted that the histogram which is formed in the *Yourlo* citation is merely a "*histrogram of dominant pitches presenting in the original music score*" and is not therefore a histogram of the "*first representation*" as recited in Claim 1 – that is, it is not a histogram of "*a set of peaks and valleys corresponding to maximum and minimum values respectively of at least one characteristic of the audio/music.*" The Examiner appears to base the obviousness rejection on broad and unsubstantiated assumptions taken from the text of the citations which go beyond what is actually expressly stated or implied. Furthermore, in respect to Claim 5, the citations also fail to teach or even suggest that a histogram is determined in respect of "*the second representation*" – that is, a histogram is not determined in respect to "*relative differences between determined peaks and valleys.*" In the absence of these features

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within the citations, Applicant respectfully submits that no *prima facie* of obviousness has been established with respect to Claims 2 and 5. Withdrawal of the rejections against Claims 2 and 5 is therefore respectfully requested.

At paragraph 19 of the Office Action, the Examiner has contended that Claim 3 is obvious in view of *Blum* when taken with the text disclosed at col. 8, lines 58-63 of *Yourlo*. Applicant respectfully submits that Claim 3 is allowable in view of the patentability of base Claim 1 and in further view of the additional technical features. The obviousness rejection against Claim 3 should therefore also be withdrawn accordingly.

At paragraph 20 of the Office Action, the Examiner has stated that Claim 10 is obvious in view of *Blum* when taken with *Yourlo*. Applicant respectfully submits that Claim 10 is also allowable in view of the patentability of base Claim 1 and in further view of the additional technical features.

At paragraph 21 of the Office Action, the Examiner has stated that Claim 11 is obvious in view of *Blum* when taken with *Yourlo*. Applicant submits that the citations make no mention of pitch detection including the use of a "windowed-fourier transform." In contrast, the citations merely teach the use of "fast-fourier transform." Claim 11 is thus allowable in the absence of any express teaching of this feature within the cited prior art and withdrawal of the rejection is therefore requested accordingly.

At paragraphs 22 and 23 of the Office Action, the Examiner has stated that Claim 4 is obvious in view of *Blum* when taken with *Miller*. Applicant submits that not all features of Claim 4 are taught in the text cited at col. 33, lines 47-55 of *Miller* because *Miller* does not teach that:

" . . . the relative difference value for a peak is given by the difference between the magnitude of a valley immediately following the peak and the magnitude of the peak . . . "

In contrast, *Miller* merely discloses that:

" . . . at each peak and valley, the maximum variation within the time interval centred on that peak or valley is measured . . . "

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Miller does not mention that the “*maximum variation*” is determined by reference to immediately adjacent peaks and valleys and could conceivably be between a peak and a valley which are not immediately next to each other as long as they are within the same time period. That is, the *Miller* reference does not teach the “relative difference value” associated feature of Claim 4. Thus, Applicant respectfully submits that the obviousness rejection against Claim 4 should be withdrawn accordingly.

At paragraphs 24 and 25 of the Office Action, the Examiner has raised an obviousness rejection against Claim 6 in view of *Blum* when taken with *Varme*. Applicant respectfully submits that Claim 6 is allowable in view of the patentability of base Claim 1 and in further view of the additional technical features.

At paragraphs 26 and 27 of the Office Action, the Examiner has raised an obviousness rejection against Claim 7 in view of *Blum* when taken with both *Varme* and *Takenaka*. Applicant notes that it would not be obvious for a person of ordinary skill in the art to consider combining the teachings disclosed in the citations because at least *Blaum* and *Varme* appear to teach away from each other – that is the *Varme* citation is clearly directed towards solving the problem of enhancing the process of learning to read musical notation (e.g. See col. 1, lines 56-60), and is entirely unrelated to the problem that is sought to be addressed by embodiments of the present invention and *Blum* – that is, improving the accuracy associated with retrieval of audio/musical information. Applicant submits that because these citations reside in clearly disparate technical fields and deal with entirely distinct problems, there is no motivation to combine the citations – let alone even consider the *Varme* document to be relevant to solving the problem at hand in the first place – in such a way as to arrive at the invention of Claim 7. Thus, Applicant requests that the obviousness rejection against Claim 7 be withdrawn accordingly.

At paragraphs 28 and 29 of the Office Action, the Examiner has stated that Claim 9 is obvious in view of *Blum* when taken with *Wang*. Applicant respectfully submits that Claim 9 is allowable in view of the patentability of base Claim 1 and in further view of the additional technical features. Withdrawal of the obviousness rejection against Claim 9 is therefore requested accordingly.

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At paragraphs 30 and 31 of the Office Action, the Examiner has stated that Claim 12 is obvious in view of *Blum* when taken with both *Yourlo* and *Footo*. Applicant submits that Claim 12 is allowable in view of the patentability of base Claim 1 and in further view of the additional technical features. Withdrawal of this obviousness rejection against Claim 12 is therefore requested accordingly.

At paragraphs 32-35 of the Office Action, Examiner has raised an obviousness rejection against Claims 14, 16, 19 and 25 in view of *Blum* when taken with *McNab* and *Ghias*. Applicant submits that at least the following feature of Claim 14 is neither taught nor suggested by the citations – that is:

“(a) determining a first representation including a set of peaks and valleys corresponding to maximum and minimum values respectively of at least one characteristic of the audio/music.”

Although the Examiner has cited the text at col. 6, lines 24-28, and, at col. 9, lines 1-41, as anticipating the above feature recited in Claim 14, neither passage in *Blum* expressly or implicitly teaches that both peaks and valleys are represented. The *Blum* citation merely teaches that the magnitude spectrum is analyzed to find “peaks.” Furthermore, the citations also fail to teach of the following feature of Claim 14:

“(b) determining a second representation including values representing relative differences between the determined peaks and valleys”

The Examiner has cited text at col. 8 of *Blum* which merely states that “*PITCH-TRAJECTORY CLEANUP routine will look over the entire pitch trajectory and smooth the data while removing bad data points.*” However, this neither expressly or implicitly discloses that the second representation includes values representing relative differences between the determined peaks and valleys. The reference to the PITCH-TRAJECTORY CLEANUP routine looking over the entire pitch trajectory does not provide a definite and concrete enabling disclosure of this

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feature of Claim 14. Moreover, the functionality of the PITCH-TRAJECTORY CLEANUP routine is clarified further at col. 13, lines 49-52 as follows:

“(Phase 1) a removal of ‘jumps’ in the pitch trace, (Phase 2) a median filtering of the pitch trace and, (Phase 3) a removal of low-confidence pitch values.”

Thus, it is clear that *Blum* is entirely silent in regard to the PITCH-TRAJECTORY CLEANUP routine determining a second representation includes values representing relative differences between the determined peaks and valleys. Instead, it teaches that the PITCH-TRAJECTORY CLEANUP routine is used to merely remove and/or filter out imperfections in the pitch trajectory. It cannot therefore be established that Claim 14 is obvious when *Blum* is read together with the other citations. Withdrawal of the rejection is therefore requested accordingly.

At paragraph 34 of the Office Action, the Examiner has raised an obviousness rejection against independent Claim 16. Applicant respectfully requests that this rejection be withdrawn based on similar arguments submitted above in relation to method Claim 14.

At paragraph 35 of the Office Action, the Examiner has raised an obviousness rejection against independent Claims 19 and 25 in view of *Blum* when taken with *McNab*. Claims 19 and 25 are allowable because the *Blum* citation does not teach “detecting peaks and valleys of the score curve.” Although the Examiner has cited the passage from *Blum* in support of the obviousness rejection, the passage is wholly irrelevant to the above feature and contains no express indication that peaks and valleys are to be detected on a score curve. The Examiner is invited to indicate where such an express teaching is made in *Blum* or any other citation. In the absence of such an express teaching, the rejection against Claims 19 and 25 must be withdrawn accordingly.

At paragraphs 36-38 of the Office Action, the Examiner has raised an obviousness rejection against Claims 15 and 21 in view of *Blum* when taken with *Ghias*, *McNab* and *Yourlo*.

In respect to Claim 15, Applicant notes that this claim depend from Claim 14 which is considered to be non-obvious as discussed above. Therefore, Applicant respectfully submits that

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Claim 15 is allowable in view of the patentability of base Claim 14 and in further view of the additional technical features.

With respect to Claim 21, Applicant submits that at least (f) and (g) are neither taught or suggested by the citations. That is, *Blum* merely teaches that “peaks” are detected without detecting both peaks and valleys. The obviousness rejection against Claim 21 cannot be sustained in the absence of all features of Claim 21 being recited in the cited documents. Withdrawal of this obviousness rejection against Claim 21 is therefore requested.

At paragraphs 39-40 of the Office Action, the Examiner has raised an obviousness rejection against Claims 18 and 24 in view of *McNab* when taken with *Ghias*.

Applicant submits that Claims 18 and 24 are allowable because the citations fail to teach or suggest at least the feature of:

“(c) using peaks and valleys of the curve so as to index the music score database”

In contrast, *Ghias* at page 4, lines 5-11 merely states that:

“Songs in the database are pre-processed to convert the melody into a stream of U,D,S characters, and the converted user input (the key) is compared with all the songs. The pattern-matching uses a “fuzzy” search to allow for errors within the matches. These errors reflect the inaccuracies in the way people hum as well as errors in the representation of the songs themselves.”

Thus, because *Ghias*, and the other citations, fail to teach the use of peaks and valleys of the curve so as to access the music score database, the obviousness rejection against Claims 18 and 24 cannot be sustained, and should be withdrawn accordingly.

At paragraphs 41-42 of the Office Action, the Examiner has raised an obviousness rejection against Claim 20 in view of *McNab* when taken with *Yourlo* and *Varme*. The obviousness rejection against Claim 20 cannot be sustained and should be withdrawn because the citations raised by the Examiner do not disclose at least one feature of Claim 20 – that is:

"using a curve including a set of digital values to represent the music score information"

Neither *Varme* or any of the other citations raised by the Examiner teach that a "curve" is used, nor do they teach that the "curve" includes a set of "digital values." *Varme* for instance merely discloses "*a musical notation system for creating music scores and colored musical instruments*" which is entirely irrelevant to the invention of Claim 20. The reference at col. 2, lines 41-45 in *Varme* also fails to teach of same. Furthermore, none of the cited documents teach that of "*using peaks and valleys of the curve so as to index the music score database.*" Although the Examiner contends that the reference in *McNab* at page 7, paragraph 3 discloses this feature, Applicant respectfully disagrees. *McNab* discusses the use of "*pitch ratios or musical intervals*" as the basis of searching a musical score database. However, Claim 20 recites that the music score database is indexed by references to "peaks and valleys of the curve" which is not disclosed by *McNab* or the other citations.

Applicant further submits that it would not be obvious for a person of ordinary skill in the art to consider combining the teachings disclosed in the citations because at least *McNab* and *Varme* appear to teach away from each other – that is the *Varme* citation is clearly directed towards solving the problem of enhancing the process of learning to read musical notation (e.g. See col. 1, lines 56-60), and is entirely unrelated to the relevant problem that is sought to be addressed by embodiments of the present invention and *McNab* – that is, effecting musical information retrieval by humming. Applicant respectfully submits that because these citations reside in clearly distinct technical fields and deal with entirely distinct problems, there is no motivation to combine the citations – let alone consider the *Varme* document relevant to solving the problem at hand in the first place – in such a way as to arrive at the invention of Claim 20.

Summary

In view of the above, none of the cited references teach or suggest, alone or in combination, the features of Claims 2-7, 9-12, 14-16, 18-22 and 24-25. Thus, Applicant respectfully submits that Claims 2-7, 9-12, 14-16, 18-22 and 24-25 are allowable over the prior art of record as discussed below.

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CONCLUSION

In view of Applicant's foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.


Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: _____

9/22/06

By: _____


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AMEND

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